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REMARKS ON THE SYSTEMATICS OF THE SARKODINA (PROTOZOA), RENAMED HOMONYMS AND NEW AND VALIDATED GENERA

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In a recent publication (Loeblich and Tappan, 1961) the writers presented an outline of the suprageneric classification of the Rhizopodea, which is to be used in the "Treatise on Invertebrate Paleontology." Since completion of that manuscript certain new developments in protozoan systematics have necessitated slight modifications, and these are here presented. In addition, several proposed genera of the "Testacea" and Foraminifera to be included in the "Treatise" have been found to be homonyms or nomina nuda and are here renamed, and five new foraminiferal genera are described so that they may be included in the "Treatise."

In the outline of suprageneric classification above mentioned, the writers recognized three subclasses within the class Rhizopodea. These subclasses, Lobosia, Filosia and Granuloreticulosia are based on the type of pseudopodia. In addition, mention was made of the recent work by Jahn and Rinaldi (1959: 15) on the mechanism of protoplasmic movement, which gave an added means of separation of the subclass Lobosia from the other two subclasses of the Rhizopodea. More recent work by Jahn, Bovee and Small (1960) has shown the advisability of recognizing a major dichotomy of the subphylum Sarkodina on the basis of protoplasmic movement.

Part of the Sarkodina are characterized by a protoplasmic movement based on differential pressure due to contraction of a plasmagel cortex, which results in a flow of plasmasol.

This mechanism has generally been accepted for the Amoebida and Mycetozoida, but is not characteristic of the remaining divisions of the Sarkodina. The remainder of the Sarkodina are characterized by a filiment-streaming type of protoplasmic movement, regarded by Jahn and Rinaldi (1959) as due to a shearing force between two adjacent oppositely moving gel-like filaments within a pseudopod, and without the presence of a plasmagel cortex.

Inasmuch as the protozoan subphyla are separated on the mechanism of movement (by pseudopodia, flagella or cilia), it is logical to assume that the two distinct mechanisms are of taxonomic importance within the Sarkodina. The separation on this basis does not entirely agree with earlier classifications, as the Lobosia are thus separated as one division opposed to the filament-streaming mechanism in both the Filosia and Granuloreticulosia of the old Rhizopodea, and the Radiolaria, Heliozoia and Acantharia of the old class Actinopodea.

A reorganization of the Sarkodina, on the basis of protoplasmic movement has been under discussion by members (including Alfred R. Loeblich, Jr.) of the Committee on Taxonomy and Taxonomic Problems of the Society of Protozoologists. Although final decisions have not yet been reached by this committee, the writers are recognizing this dichotomy in the "Treatise on Invertebrate Paleontology," hence are herein restricting the class Rhizopodea to include only the subclass Lobosia characterized by the pressure flow mechanism and are recognizing the class Reticularia Lankester as distinct, including those subclasses characterized by the filament-streaming mechanism, the Filosia, Granuloreticulosia, Radiolaria, Heliozoia, and Acantharia. These last three subclasses have already been covered for the "Treatise on Invertebrate Paleontology" by Campbell and Moore, 1954.

In the reclassification of the order Foraminiferida by the writers (Loeblich and Tappan, 1961), 17 superfamilies were recognized, based on wall composition, structure and chamber development. As certain of these superfamilies are more closely related than others, it is thought advisable to group these somewhat more concisely into suborders, based solely on wall composition. These are similar in part to the divisions

used approximately a century ago by Carpenter, Parker and Jones, 1862, Lankester, 1885, etc.—i.e., Imperforata and Perforata, Arenacidae, etc. The names used herein for the suborders are based on the names of included genera. Although categories of ordinal rank are not required to be recognized on the basis of priority, we have done so when subordinal names based on an included genus were available. These suborders thus are the Allogromiina Loeblich and Tappan, new suborder, Textulariina Delage and Hérouard, 1896, Fusulinina Wedekind, 1937, Miliolina Delage and Hérouard, 1896, and Rotaliina Delage and Hérouard, 1896.

Subphylum SARKODINA Hertwig and Lesser, 1874

Class Rhizopodea von Siebold, 1845

Unicellular organisms with amoeboid principal stage, no meganucleus; pseudopodia lobose, very rarely filiform or anastomosing, naked forms with protoplasm differentiated into endoplasm and ectoplasm, and shelled forms with zonal differentiation of protoplasm frequent. In some forms plasmodia may develop by fusion of individual amoebulae. Protoplasmic movement occurs by means of a flow of plasmasol caused by differential pressure due to contraction of plasmagel cortex (see Jahn and Rinaldi, 1959: 101).

The Rhizopodea is here restricted to include only the subclass Lobosia, with orders Amoebida, Arcellinida, and Mycetozoida.

Subclass Lobosia Carpenter, 1861

Order Arcellinida Kent, 1880

Superfamily Arcellacea Ehrenberg, 1832

Family Hyalospheniidae Schulze, 1877

Apodera Loeblich and Tappan, new genus

Type species: Nebela vas Certes (1891: L15).

Test 130–210 μ in length, with subspherical body, separated from the narrowed neck by a distinct constriction, represented in the interior by a chitinous girdle; wall composed of large, regular, oval plates. Recent: southern hemisphere, South America, Australia, Hawaii, Java, Africa.

Remarks: The genus was proposed by Jung (1942a: 256; 1942b: 369, 380) with the description of two species and one variety, but without type citation and therefore a nomen nudum needing validation.

Certesella Loeblich and Tappan, new genus

Type species: Nebela martiali Certes (1891: L14).

Test chitinous, 80–200 μ in length, flask-shaped with large, very thin, almost transparent, polygonal plates; with 6 large pores in addition to the

aperture, arranged in pairs, the first pair about midway on the neck, the other two pairs perpendicular to these at the base of the neck, additional small pores occur near the aperture. Recent: southern hemisphere.

Remarks: Proposed by Jung (1942a: 256, 317; 1942b: 381) as *Penardiella* (*Nebela*) (a homonym of *Penardiella* Kahl, 1930) without type designation and therefore a nomen nudum needing validation. It is interesting to note that *Nebela* Leidy, 1875 was placed as a subgenus of *Penardiella* Jung, 1942.

Jungia Loeblich and Tappan, new genus

Type species: Jungia sundanensis van Oye (1949: 331).

Test sack-like, globular to ovate, not compressed, of polygonal or elongate plates with a rim of sand grains forming a collar around the aperture; aperture round, central. Recent: Java, Venezuela.

Remarks: Proposed by van Oye (1949: 330) with description of two species, but without type citation and therefore a nomen nudum needing validation.

Superfamily Cryptodifflugiacea Jung, 1942

Family Cryptodifflugiidae Jung, 1942

Petalopella Loeblich and Tappan, new name

Type species: Petalopus diffluens Claparède and Lachmann (1859: 442).

Petalopella, new name, is proposed for *Petalopus* Claparède and Lachmann (1859: 442), not *Petalopus* Kirby and Spence, 1828, and not *Petalopus* Motschoulsky, 1845.

Class Reticularea Lankester, 1885, name corrected

Class Reticularia Lankester, 1885, Encyclopaedia Britannica, 9th Ed., v. 19: 845

Unicellular organisms with amoeboid principal stage; pseudopodia may be filopodia, reticulopodia, or axopodia; may have secreted or agglutinated skeleton; protoplasmic movement by an active shearing or sliding between adjacent gel-like filaments moving in opposite directions in the same pseudopod, and in the absence of a plasmagel cortex.

The class Reticularea includes subclass Filosia with orders Aconchulinida and Gromiida, subclass Granuloreticulosia with orders Athalamida, Foraminiferida (including the order Monothalamida of the earlier publication of the writers, 1961), Xenophyophorida and Labyrinthulida and the subclasses Radiolaria, Heliozoia, and Acantharia.

Subclass Filosia Leidy, 1879

Order Gromida Claparède and Lachmann, 1859

Superfamily Gromiacea Reuss, 1862

Family Gromiidae Reuss, 1862

Bargoniella Loeblich and Tappan, new name

Type species: Salpicola amylaceae Bargoni (1894: 43).

Bargoniella, new name, is proposed for *Salpicola* Bargoni (1894: 43), not *Salpicola* Richiardi, 1880.

Family Amphitremidae Poche, 1913

Archerella Loeblich and Tappan, new name

Type species: Ditrema flavum Archer (1877a: 103; 1877b: 336).

Archerella, new name is proposed for *Ditrema* Archer (1877a: 103; 1877b: 336), not *Ditrema* Temminck and Schlegel, 1844.

Subclass Granuloreticulosia de Saedeleer, 1934

Order Foraminiferida Zborzewski, 1834

Suborder **Allogromiina** Loeblich and Tappan, new suborder

Test membranous or chitinous, may have ferruginous encrustations or more rarely small quantities of agglutinated material. Includes the superfamily Lagynacea Schultze, 1854.

Suborder Textulariina Delage and Hérouard, 1896, name corrected

Suborder Textularidae Delage and Hérouard, 1896, Traité Zool. Concrète: 139

Test agglutinated with foreign matter held by various cements. Includes superfamilies Ammodiscacea Reuss, 1862, and Lituolacea Lamarck, 1809.

Superfamily Ammodiscacea Reuss, 1862

Family Saccamminidae Brady, 1884

Subfamily **Diffusulininae** Loeblich and Tappan, new subfamily

Test free or attached, with interior partially subdivided into chamberlets. Type genus: *Diffusulina* Heron-Allen and Earland, 1924.

Oryctoderma Loeblich and Tappan, new genus

Type species: Crithionina rotundata Cushman, 1910: 56.

Test free, large, globular, unilocular; central cavity relatively small, simple and spherical; wall agglutinated, very thick and loosely cemented, with numerous ramifying canals leading from the central cavity to the exterior, the margins of the canals being relatively firmly cemented; apertures consist of numerous circular to polygonal openings on the surface which lead into these canals.

Remarks: The type species of this genus was originally placed in *Crithionina* Goës. However, the redescription of the type species (*C. mamilla* Goës) by Höglund (1947: 31) based on the original material of Goës, has shown that this genus should be restricted to the attached forms with relatively thin and simple wall, and large chamber cavity

divided by a single more or less well-developed partial septum. The free-living species with small central cavity and thick wall traversed by labyrinthine canals opening into large surface perforations therefore are removed from *Crithionina* to the new genus *Oryctoderma*. In addition to *C. rotundata*, the Recent *C. pisum* Goës, 1896, and probably *C. rugosa* Goës, 1896, and *C. teicherti* Parr, 1942 (Permian of Australia), belong to the new genus.

Daitrona Loeblich and Tappan, new genus

Type species: Crithionina lens Goës, 1896: 24.

Test free, 2–4 mm in diameter, lenticular in section, rounded to oblong in plan; the single chamber subdivided by radial semisepta or secondary partitions, projecting inward from the wall, sometimes almost completely subdividing the test; wall finely agglutinated, loosely cemented; no localized aperture.

Remarks: *Daitrona*, new genus, differs from *Crithionina* Goës in being free and in having numerous radiating secondary partitions subdividing the chamber. It differs from *Oryctoderma*, new genus, in having a thin wall with secondary partitions nearly completely segmenting the test, rather than a thick wall with labyrinthine passages connecting the smoothly finished inner cavity to the exterior.

Superfamily Lituolacea Lamarck, 1809

Family Ataxophragmiidae Schwager, 1877

Subfamily Eggerellinae Cushman, 1937

Multifidella Loeblich and Tappan, new genus

Type species: Clavulina communis d'Orbigny var. *nodulosa* Cushman (1922a: 85).

Test free, elongate, early portional trochospiral with four or five chambers per whorl, progressively reducing to triserial, biserial, and uniserial, the uniserial stage comprising a large proportion of the adult test; wall finely agglutinated, aperture terminal, cribrate, consisting of variously aligned, elongate slits with bordering lips. Range: Miocene–Recent.

Remarks: Multifidella, new genus, differs from *Cribrogoesella* Cushman in the slender test with elongate uniserial stage and in having a multiple aperture consisting of slits with bordering lips. Originally described as *Clavulina*, the present type species was later transferred to *Listerella* Cushman, 1933 (not *Listerella* Jahn, 1906 = *Schenckiella* Thalmann, 1942) by Cushman (1936: 428), to *Schenckiella* by Cushman and Todd (1945: 8) and to *Martinottiella* by Cushman (1947: 50). *Schenckiella* is regarded by the writers as a synonym of *Martinottiella* Cushman, 1933. The present genus appears to have arisen from *Martinottiella* by the development of a multiple aperture much as *Cribrogoesella* Cushman, 1935, developed from *Goesella* Cushman, 1933. The lectotype of *Multifidella nodulosa* Cushman, here designated (USNM

16312b), is from *Albatross* Station D2547, lat. 39° 54′ 30″ N, long. 70° 20′ 00″ W, at 390 fathoms.

Suborder Fusulinina Wedekind, 1937, name corrected

Suborder Fusulinacea Wedekind, 1937, Einführung in die grundlagen der historischen geol., Band 2: 79

Primitively of microgranular calcite, advanced forms with two or more differentiated layers in the wall. Includes the superfamilies Parathuramminacea Bykova, 1955; Endothyracea Brady, 1884; and Fusulinacea Möller, 1878.

Suborder Miliolina Delage and Hérouard, 1896, name corrected

Suborder Miliolidae Delage and Hérouard, 1896, Traité Zool. Concrète: 117

Wall porcellanous, imperforate at least in postembryonic stages. Includes superfamily Miliolacea Ehrenberg, 1839.

Suborder Rotaliina Delage and Hérouard, 1896, name corrected

Suborder Rotalidae Delage and Hérouard, 1896, Traité Zool. Concrète: 143

Wall calcareous, perforate. Includes superfamilies Nodosariacea Ehrenberg, 1839; Buliminacea Jones, 1875; Asterigerinacea d'Orbigny, 1839; Rotaliacea Ehrenberg, 1839; Globigerinacea Carpenter, Parker and Jones, 1862; Orbitoidacea Schwager, 1876; Cassidulinacea d'Orbigny, 1839; Carterinacea Loeblich and Tappan, 1955; and Spirillinacea Reuss, 1862.

Superfamily Nodosariacea Ehrenberg, 1839

Family Nodosariidae Ehrenberg, 1839

Subfamily Nodosariinae Ehrenberg, 1839

Lankesterina Loeblich and Tappan, new genus

Type species: Bolivina frondea Cushman (1922b: 126).

Test free, small, symmetrically biserial throughout, with flattened sides and truncate margins; chambers low and broad as in the later stage of *Dyofrondicularia,* but without an early uniserial stage; wall calcareous, finely perforate; aperture terminal, radial. Range: Oligocene.

Remarks: Originally described as a *Bolivina,* the type species of the present genus was later transferred to *Polymorphina* by Cushman (1929: 41) because of the radial aperture, which was illustrated by Cushman and Ozawa (1930: Pl. 30, Fig. 11). *Lankesterina* differs from *Polymorphina* in being completely symmetrical throughout and in having truncate margins, similar to the other palmate genera of the Nodosariinae (*Dyofrondicularia, Frondicularia,* etc.), but differs from these in being

biserial throughout. *Polymorphina* is somewhat asymmetrical particularly in its early development, and may show traces of a sigmoid development.

The genus is named in honor of Sir Edwin Ray Lankester (1847–1929) in recognition of his outstanding contributions to the systematics of the Protozoa, and the foraminifera in particular.

Astacolus Montfort, 1808

Astacolus barrowensis Tappan, new name

Astacolus calliopsis Tappan, 1955, U. S. Geol. Survey Prof. Paper 236-B: 55, Pl. 17, Figs. 12–17 (not *Astacolus calliopsis* (Reuss), 1863, Bartenstein and Brand, 1951).

This species was noted by Thalmann (1958: 761) to be a homonym and it is herewith renamed. It occurs in the lower Jurassic Kingak formation (of Late Pliensbachian age) in South Barrow Test Well 3, south of Point Barrow, northern Alaska. The new specific name refers to the locality from which it was obtained.

Family Glandulinidae Reuss, 1860

Subfamily Glandulininae Reuss, 1860

Entolingulina Loeblich and Tappan, new genus

Type species: Lingulina aselliformis Buchner, 1942: 121.

Test free, elongate, compressed, of two or more chambers in a rectilinear series, commonly with considerable overlap of earlier chambers; wall calcareous, finely perforate, hyaline; aperture ovate or an elongate slit, with a distinct entosolenian tube projecting into the final chamber.

Remarks: Entolingulina, new genus, differs from *Lingulina* in having an entosolenian tube and from *Glandulina* in lacking the early biserial stage, in being compressed, and in the slit or ovate aperture rather than a radiate one. Many two-chambered species have been described which may belong to *Entolingulina*, but may also be twinned or freak specimens of *Fissurina*. This can be determined only by an examination of suites of these species and associated *Fissurina* if any. Among these two-chambered forms possibly referable to *Entolingulina* are *Lingulina armata* Sidebottom, 1907, *L. bicarinata* forma *nasuta* Buchner, 1942, *L. carinata* var. *biloculi* Wright, 1911, *L. cornigera* Buchner, 1942, *L. cucullifera* Buchner, 1942, *L. falcata* Heron-Allen and Earland, 1932, *L. herdmanni* Chaster, 1892, *L. inarimensis* Buchner, 1942, *L. lagenoides* Buchner, 1942, *L. translucida* Heron-Allen and Earland, 1932, and *L. tubulata* Buchner, 1942.

Superfamily Rotaliacea Ehrenberg, 1839

Family Pellatispiridae Hanzawa, 1937

Pokornyella Loeblich and Tappan, new name

Type species: Siderina douvillei Abrard (1926: 31).

Pokornyella, new name, is proposed for *Siderina* Abrard (1926: 31),

not *Siderina* Dana, 1848. It is named in honor of Dr. V. Pokorný, Charles University, Prague, Czechoslovakia, in recognition of his contributions to micropaleontology.

Subclass Radiolaria J. Müller, 1858

Although four recent monographs have been concerned with this group (Campbell in Moore, 1954; Deflandre in Grassé, 1953; Deflandre in Piveteau, 1952, and Streklov and Lipman in Rauser-Chernousova and Fursenko, 1959) a number of generic homonyms have not yet been renamed. For other homonyms, new names have been proposed in the past, but overlooked or regarded as synonyms of the invalid homonyms. These are here discussed, and the homonyms renamed under the family headings as used by Campbell in Moore, 1954. Some family group names are also changed from those used by Campbell, on the basis of priority. Only family group names applying to the corrected genera are here included.

The publication of Haeckel, 1882, cited by Campbell in Moore (1954) was according to the cover for this number actually published and distributed 25 November 1881, hence dates for the families cited below as Haeckel, 1881, refer to the publication listed by Campbell as 1882.

Superfamily Thallassosphaeracea Haeckel, 1862, name corrected

Family Thalassosphaeridae Haeckel, 1862

Thalassorhaphis Campbell, 1951

Campbell proposed the genus (1951: 527) as *Thalassorhaphis,* with type species *Thalassoplancta brevispicula* Haeckel, 1887. In a later paper Campbell (1953: 298) corrected this to *Thalassorrhaphis,* stating that it was originally incorrectly derived, and was corrected to agree with rules of Greek word composition. According to the rules, changes are not allowed on the basis of incorrect word formation, only when these can be shown to be a lapsus calami or typographical error.

Family Lithacanthidae Popofsky, 1907

Genus **Tetracina** Loeblich and Tappan, new name

Type species: Tetracanthus simplex Popofsky, 1907.

The name is proposed for *Tetracanthus* Popofsky, 1907, Zool. Anzeiger, vol. 31: 701; not *Tetracanthus* Hemprich and Ehrenberg, 1866, in Schneider, Monogr. Nemat.: 104. Verm. (Nemat.) See Campbell (1954: D46).

Superfamily Ethmosphaeracea Haeckel, 1862, name transferred

Family Ethmosphaeridae Haeckel, 1862, name transferred

[Ethmosphaerida Haeckel, 1862; Ethmosphaerinae Campbell, 1954; Liosphaerida Haeckel, 1881; Liosphaeridae Campbell, 1954; Cenosphaeridae Deflandre, 1952.]

According to the rules, no family can include a subfamily of prior date, hence this family name must be Ethmosphaeridae Haeckel, 1862; not Liosphaeridae Haeckel, 1881.

Subfamily Ethmosphaerinae Haeckel, 1862

Cenosphaera Ehrenberg, 1854

Subgenus **Chaunosphaera** Loeblich and Tappan, new name

Type species: Cenosphaera primordialis Haeckel, 1887.

Cenosphaera (*Chaunosphaera*) is here proposed for *Cenosphaera* (*Porosphaera*), as *Porosphaera* Haeckel, 1887, Rep. Voy. *Challenger* Exped. Zool., vol. 18(1): 67, is preoccupied by *Porosphaera* Steinmann, 1878, Palaeontogr., vol. 25, no. 3: 120, Spong. *Porosphaera* is recognized by Campbell (1954: D50) and Deflandre in Piveteau (1952: 770).

Subfamily Plegmosphaerinae Haeckel, 1881

Dictyoplegma Haeckel, 1862

Type species: Dictyosoma spongiosum Müller, 1858.

Dictyoplegma Haeckel, 1862, Radiolaria, vol. 1: 452, 458, was proposed as a new name for *Dictyosoma* Müller, 1856, Monatsber. Akad. Wiss. Berlin, 1856: 485; not *Dictyosoma* Temminck and Schlegel, 1845, in Siebold, F. Japon. (Pisc.): 139, Pisces. The name *Dictyosphagma* Mivart, 1878, was also proposed as a new name for this genus, and is an objective synonym. Campbell (1954: D50) cites *Spongodictyon* Haeckel, 1862 (= *Spongodictyum*?) as an objective synonym of *Dictyosoma* and *Spongodictyon* also was used by Deflandre in Grassé (1953: 342) and by Strelkov and Lipman in Rauser-Chernousova and Fursenko (1959: 433).

This genus and its type subgenus thus should be referred to *Dictyoplegma* Haeckel, 1862, and the subgenus *Dictyosoma* (*Spongodictyoma*) Haeckel, 1862, should be transferred to *Dictyoplegma* (*Spongodictyoma*).

Family Triposphaeridae Vinassa de Regny, 1898

Vinassaia Cossmann, 1900

Vinassaia was proposed by Cossmann, 1900, Rev. Crit. Palaezool. vol. 4: 42, for *Rustia* Vinassa de Regny, 1898, Riv. Ital. Paleont., vol. 4: 53; not *Rustia* Stål, 1866, Hem. Afric., vol. 4: 8, Hem. Both Deflandre in Grassé (1953: 417) and Campbell in Moore (1954: D56) cite the genus under the homonymous name, without mention of *Vinassaia*, proposed as its replacement.

Family Actinommidae Haeckel, 1862, name corrected and transferred

[Actinommida Haeckel, 1862; Actinommatinae Campbell, 1954]

This family was regarded as Astrosphaeridae Haeckel, 1882, by Campbell in Moore (1954: D60), but as a family cannot contain a subfamily of prior date, the earliest family group name is here used.

Subfamily Astrosphaerinae Haeckel, 1881

Anomalacantha Loeblich and Tappan, new name

Type species: Heteracantha dentata Mast, 1910.

The new name is here proposed for *Heteracantha* Mast, 1910, Ergeb. Tiefsee-Exped., vol. 19, no. 4: 159–161; not *Heteracantha* Brullé, 1834, H. N. Ins., vol. 4, no. 2 (Col.): 383. Col. See Campbell in Moore (1954: D62).

Anomalosoma Loeblich and Tappan, new name

Type species: Heterosoma heptacanthum Mast, 1910.

Anomalosoma is proposed as a new name for *Heterosoma* Mast, 1910, Ergeb. Tiefsee-Exped., vol. 19, no. 4: 167; not *Heterosoma* Schaum, 1845, Ann. Soc. ent. France, ser. 2, vol. 2: 390, 426. Col. (Cetoniid.); and not *Heterosoma* Bernhauer, 1903, Ent. Ztg. Stettin, vol. 64: 33. Col. (Staphylinid). See Deflandre in Grassé (1953: 403–404) and Campbell in Moore (1954: D62).

Superfamily Spongiracea Haeckel, 1862, name transferred

[Spongurida Haeckel, 1862; Ellipsida Haeckel, 1887; Prunoidea Haeckel, 1887; Ellipsidiicae Campbell, 1954]

The superfamily was referred to the Ellipsidiicae by Campbell in Moore (1954: 68) but as a superfamily cannot contain a family or subfamily of prior date, the earliest family group name is here used and elevated to superfamily rank.

Family **Cyphantellidae** Loeblich and Tappan, substitute name

The type genus of the family Cyphantidae Campbell, 1954, is a homonym. As *Cyphantella* Haeckel, 1887, replaces *Cyphanta* Haeckel, 1887, as the valid name for this taxon, the new family name Cyphantellidae is proposed, with *Cyphantella* Haeckel, 1887, as type genus.

Cyphantella Haeckel, 1887

Type species: Cyphanta colpodes Haeckel, 1887.

Both Deflandre in Grassé (1953: 421) and Campbell in Moore (1954: D74) refer to this genus as *Cyphanta* Haeckel, 1887 (Rep. Voy. *Challenger*, Zool., vol. 18, pt. 1: 360), which is a homonym of *Cyphanta* Walker, 1865, List Specimens Lep. Ins. Brit. Mus., vol. 33: 855, Lep. Although *Cyphantella* Haeckel, 1887, was regarded as an objective synonym of *Cyphanta* by Campbell, it is the first valid name available for the genus.

The type subgenus will therefore be referred to *Cyphantella* (*Cyphantella*), and *Cyphanta* (*Cyphantissa*) Haeckel, 1887, becomes *Cyphantella* (*Cyphantissa*).

Superfamily Coccodiscacea Haeckel, 1862, name transferred

[Coccodiscida Haeckel, 1862; Cenodiscida Haeckel, 1887; Cenodiscicae Campbell, 1954]

Subsuperfamily Coccodiscilae Haeckel, 1862, name transferred

The oldest validly proposed family group names within this superfamily are Coccodiscida Haeckel, 1862, and Trematodiscida Haeckel, 1862. The last named is based on the genus *Trematodiscus* Haeckel, 1860, an objective synonym of *Flustrella* Ehrenberg, 1839. Therefore, the superfamily name must be based on the family Coccodiscidae Haeckel, and it is here transferred to superfamily status.

The subsuperfamily Cenodiscilae Haeckel, 1887, of Campbell in Moore (1954: D76) thus becomes the Coccodiscilae Haeckel, 1862. The family names remain unchanged within the Coccodiscilae.

Family Phacodiscidae Haeckel, 1881

Subfamily Heliosestrinae Haeckel, 1887

Triactoma Rüst, 1885

Triactis Haeckel, 1881, Jena. Zeitsch., vol. 15: 457. *Type species: Triactoma tithonianum* Rüst, 1885, subsequent designation by Campbell in Moore, 1954: D81; not *Triactis* Klunzinger, 1877, Koralthiere rothen Meeres, vol. 1: 85.

Triactoma Rüst, 1885, Palaeontographica, vol. 31 (N.F., vol. 11): 289. *Type species: Triactoma tithonianum* Rüst, 1885, subsequent designation by Campbell in Moore, 1954: D81.

Triactiscus Haeckel, 1887, Rep. Voy. *Challenger* Exped., Zool., vol. 18, pt. 1: 421. *Type species: Triactiscus tripyramis* Haeckel, 1887, subsequent designation by Strelkov and Lipman in Rauser-Chernousova and Fursenko, 1959: 443.

The nomenclatural status of this genus has been confused. Campbell in Moore (1954: D81) recognized this genus as *Triactis* Haeckel, 1882 (sic), and cited *Triactoma titonianum* (sic) Rüst (correctly *Triactoma tithonianum*). Both *Triactoma* and *Triactiscus* were listed as objective synonyms, indicating that all three have the same type species. None of these three generic names was mentioned by Deflandre in Grassé (1953), but Strelkov and Lipman in Rauser-Chernousova and Fursenko (1959: 443) recognize *Triactiscus* with *T. tripyramis* Haeckel listed as type species. The generic name *Triactis* was proposed by Haeckel (1881: 457), without citation of species, hence any species could be later selected as type. However, the name was a homonym of *Triactis* Klunzinger, 1877.

Triactoma was used by Rüst, apparently as a substitute name for *Triactis* Haeckel, 1881, not Klunzinger, 1877, although the earlier name was not mentioned. Rüst stated (1885: 10) that he followed the classification, families and genera of Haeckel (1881) and that the latter was so detailed that only two new generic names were required for the

Jurassic forms, *Podocapsa* and *Salpingocapsa*. In the description of these two new genera by Rüst the new names were followed by the notation "n.g." and a generic diagnosis. *Triactoma* was merely given as a heading (as were the other generic names of Haeckel) before the descriptions of the species included therein. Furthermore, *Triactoma* is not mentioned by Neave, 1940, in Nomenclator Zoologicus, or in the supplement (1950). Rüst included and described three species in *Triactoma*—all new, *Triactoma tithonianum, T. pachyacantha* and *T. ilsedense*. The type species selected by Campbell in Moore was the first species described in Rüst's publication.

In 1887 Haeckel used the generic name *Triactiscus*, as a substitute name for *Triactis*. Although he did not mention the change in spelling, he cited the earlier paper and page where *Triactis* was described. No mention was made of Rüst's paper, and it is possible that the *Challenger* report was already in press before Rüst's paper had appeared. Haeckel described three species under *Triactiscus, T. tripyramis*, n. sp., *T. tricuspis*, n. sp., and *T. tripodiscus* Haeckel (including *Haliomma triactis* Ehrenberg, 1875, as a synonym, which has priority as a specific name over *T. tripodiscus*). As only three species were included by Haeckel, one of these must be cited as type. It cannot be an objective synonym of *Triactoma*, as stated by Campbell, as *Triactoma tithonianum* Rüst was not in the original list of species included in *Triactiscus*. The citation of *Triactiscus tripyramis* Haeckel as type, by Strelkov and Lipman in Rauser-Chernousova and Fursenko (1959: 443) is therefore valid—this being the first of the three species cited by Haeckel. Although both *Triactoma* and *Triactiscus* were apparently intended as new names for the homonym *Triactis* Haeckel, 1881, not Klunzinger, 1877, they nevertheless have different type species, as these were fixed by subsequent designation and must therefore in each case be one of the species included by the author of the genus.

The correct name for this genus is therefore *Triactoma* Rüst, 1885, as it has priority over *Triactiscus* Haeckel, 1887.

Subsuperfamily Ommatodiscilae Stöhr, 1880, name transferred

[Trematodiscida Haeckel, 1862; Ommatodiscidae Stöhr, 1880; Cyclodiscarea Haeckel, 1887; Euchitoniilae Campbell, 1954]

The oldest validly proposed family group name within this subsuperfamily is Trematodiscida Haeckel, 1862, based on *Trematodiscus* Haeckel, 1860, which is an objective synonym of *Flustrella* Ehrenberg, 1839. The oldest name based on a valid generic name is therefore the Ommatodiscida Stöhr, 1880, which should be used as a basis for the family group names referred by Campbell in Moore (1954) to the family Euchitoniidae Haeckel, 1887 [= Ommatodiscidae] and the subsuperfamily Euchitoniilae [= Ommatodiscilae].

Family Ommatodiscidae Stöhr, 1880

Subfamily Euchitoniinae Haeckel, 1887

Amphibrachella Haeckel, 1887

Type species: Amphibrachium diminutum Haeckel, 1887.

The name *Amphibrachella* Haeckel, 1887, was regarded as an objective synonym of *Amphibrachium* Haeckel, 1881, by Campbell in Moore (1954: D86). *Amphibrachium* was also recognized by Deflandre in Grassé (1953: 349), and by Strelkov and Lipman in Rauser-Chernousova and Fursenko (1959: 446). However, *Amphibrachium* Haeckel, 1881, Jena Zeitsch., vol. 15: 460 is a homonym of *Amphibrachium* Schulze, 1880, Trans. Roy. Soc. Edinburgh, vol. 29: 672, and the next valid name available is *Amphibrachella.* The subgenera of *Amphibrachium,* listed by Campbell in Moore (1954: D86) may thus be known as *Amphibrachella* (*Amphibrachella*), *A.* (*Amphibrachidium*), and *A.* (*Amphibrachura*), all of Haeckel, 1887.

Subfamily Flustrellinae Campbell, 1954

Flustrella Ehrenberg, 1839

Subgenus **Discospirella** Loeblich and Tappan, new name

Type species: Discospira helicoides Haeckel, 1862.

The new subgeneric name is proposed for *Discospira* Haeckel, 1862, which was regarded as a subgenus of *Flustrella* Ehrenberg, 1839, by Campbell in Moore (1954: D90). *Discospira* Haeckel, 1862, Die Radiolarien, vol. 1: 513, is a homonym of *Discospira* Mantell, 1850, Pict. Atlas: 142, Foraminifera, and of *Discospira* Semper, 1862, Arch. Ver. Freunde Naturgesch. Mecklenburg, vol. 15: 380, Moll.

Subgenus **Perispirella** Loeblich and Tappan, new name

Type species: Porodiscus perispira Haeckel, 1887.

Perispirella is proposed for *Perispira* Haeckel, 1881, regarded by Campbell in Moore (1954: D90) as a subgenus of *Flustrella* Ehrenberg, 1839. *Perispira* Haeckel, 1881, Jena Zeitschr., vol. 15: 459, is a homonym of *Perispira* Stein, 1859, Lotos, vol. 9, pt. 1: 60, Protozoa, Ciliata.

Superfamily Litheliacea Haeckel, 1862, name transferred

[Lithelida Haeckel, 1862; Litheliidae Campbell, 1954]

The family group name based on *Lithelius* Haeckel, 1862, has priority over the Laracarida Haeckel, 1887, which was elevated to superfamily rank by Campbell in Moore (1954: D95).

Family Pyloniidae Haeckel, 1881

Trizonium Haeckel, 1887

Type species: Echinosphaera datura Hertwig, 1879.

Echinosphaera Hertwig, 1879, was recognized for this taxon by Campbell in Moore (1954: D96) and *Trizonium* Haeckel, 1887, and *Trizonites*

Haeckel, 1887, regarded as objective synonyms. However, *Echinosphaera* Hertwig, 1879, Denkschr. Ges. Jena, vol. 2: 181, is a homonym of *Echinosphaera* Angelin, 1878, Iconog. Crin. Sil.: 28, Echin., and the next available name is *Trizonium* which is here regarded as the valid name.

Superfamily PLAGONIACEA Haeckel, 1881, name corrected

[Plagonida Haeckel, 1881; Plectida Haeckel, 1881; Plectoidea Haeckel, 1887; Plagoniicae Campbell, 1954]

Family Plectaniidae Haeckel, 1881

Subfamily Triplectinae Haeckel, 1881

Deflandrella Loeblich and Tappan, new name

Type species: Campylacantha cladophora Jörgensen, 1905.

The new name is proposed for *Campylacantha* Jörgensen, 1905, in Nordgaard and Jörgensen, Bergens Mus. Hydrogr. Invest.: 129, not *Campylacantha* Scudder, 1897, Proc. Amer. Acad., vol. 32, no. 9: 198, 204, Orth. The genus was recorded as *Campylacantha* Jörgensen by Deflandre in Grassé (1953: 405, 406), by Campbell in Moore (1954: D104) and by Strelkov and Lipman in Rauser-Chernousova and Fursenko (1959: 400). *Deflandrella* is named in honor of Professor G. Deflandre, in recognition of his work on the Protozoa.

Plectophorina Loeblich and Tappan, new name

Type species: Plectophora triomma Haeckel, 1887.

The new name is proposed for *Plectophora* Haeckel, 1881, Jena Zeitschr., vol. 15: 424, not *Plectophora* Gray, 1834, Ill. Indian Zool., vol. 2 (pts. 15, 16), pl. 42, Aves. The genus is discussed by Campbell in Moore (1954: D104).

Subfamily Tetraplectinae Haeckel, 1881

Talariscus Loeblich and Tappan, new name

Type species: Obeliscus pseudocuboides Popofsky, 1913.

The new name is proposed for *Obeliscus* Popofsky, 1913, Deutsch. Sudpolar Exped., vol. 14, no. 2: 279, not *Obeliscus* Beck, 1837, Index Moll. Mus. Ch. Fred., vol. 1: 61, moll. and not *Obeliscus* Agassiz, 1845, Nom. Zool. (Moll.): 60, Moll. The genus was described as *Obeliscus* by Campbell in Moore (1954: D104).

Superfamily ACANTHODESMIACEA Hertwig, 1879, name transferred

[Acanthodesmida Hertwig, 1879; Acanthodesmidae Campbell, 1954]

The family group name based on *Acanthodesmia* Müller, 1858, has priority over the Stephida Haeckel, 1881, and Stephanida Haeckel, 1887, and the superfamily Stephaniicae of Campbell in Moore (1954: D105) must be changed to Acanthodesmiacea.

Family Paratympanidae Haeckel, 1881

Subfamily Protympaniinae Haeckel, 1887

Toxarium Haeckel, 1887

Subgenus **Toxidiella** Loeblich and Tappan, new name

Type species: Toxidium cordatum Haeckel, 1887.

The new subgeneric name is proposed for *Toxarium* (*Toxidium*) as described by Campbell in Moore (1954: D109). *Toxidium* Haeckel, 1887, Rep. Voy. *Challenger* Exped., vol. 18, pt. 2: 996 is preoccupied by *Toxidium* Leconte, 1860, Proc. Acad. Nat. Sci. Philadelphia, 1860: 324, Col.

Superfamily Archipiliacea Haeckel, 1881, name corrected

[Archipilida Haeckel, 1881; Archipiliicae Campbell, 1954]

Family Sethophatnidae Haeckel, 1881, name corrected

[Sethophatnida Haeckel, 1881; Sethophaenida Haeckel, 1887, Sethophatninae Campbell, 1954]

The family group name Sethophormida Haeckel, 1881, is based on *Sethophormis* Haeckel, 1887, a synonym of *Tetraphormis* Haeckel, 1881, hence the oldest family group name based on a valid genus is Sethophatnida Haeckel, 1881. The family Sethophatnidae includes the genera and subfamilies included by Haeckel, 1887, in the Anthocyrtida, by Frizzell and Middour (1951: 8) in the Sethophormidae and by Campbell in Moore (1954: D124–128) in the family Sethophormididae.

Anthocyrtella Haeckel, 1887

Type species: Anthocyrtis mespilus Ehrenbreg, 1854.

Campbell in Moore (1954: D125) and Strelkov and Lipman in Rauser-Chernousova and Fursenko (1959: 455) refer to this genus as *Anthocyrtis* Ehrenberg, 1847. However, *Anthocyrtis* Ehrenberg, 1847, Monatsber. Akad. Wiss. Berlin, 1847: 54, is a homonym of *Anthocyrtis* Ehrenberg (January 1847), Bericht Verh. preuss. Akad. Wiss., 1846, tab. p. 385, pisces. *Anthocertella* Haeckel, 1887, Rep. Voy. *Challenger* Zool., vol. 18(2): 1269, was regarded as an objective synonym by Campbell but is the next valid name available. *Anthocyrtissa* Haeckel, 1887, and *Anthocyrtura* Haeckel, 1887, were placed as subgenera of *Anthocyrtis* by Campbell in Moore (1954: D126) and may now be considered as *Anthocyrtella* (*Anthocyrtissa*) and *Anthocyrtella* (*Anthocyrtura*) respectively.

Dictyoprora Haeckel, 1881

Type species: Sethamphora hexapleura Haeckel, 1887.

This genus includes the forms previously placed in the genus *Cryptocephalus* Haeckel, 1881, and the subgenera *Cryptocephalus* (*Cryptocephalus*) Haeckel, 1881, and *C.* (*Dictyoprora*) Haeckel, 1881, of Campbell in Moore (1954: D127). The generic name *Cryptocephalus* Haeckel, 1881, Jena Zeitschr., vol. 15: 430, is a homonym of *Cryptocephalus*

Geoffroy, 1762, Hist. Insect. Paris, vol. 1: 231, Col., and of *Cryptocephalus* van Beneden, 1849, Bull. Acad. Roy. Bruxelles, vol. 16, no. 1: 192, Verm. (Cest.). The objective synonym *Sethamphora* Haeckel, 1887, was recognized by Deflandre in Piveteau (1952: 310–311), by Deflandre in Grassé (1953: 426), and by Strelkov and Lipman in Rauser-Chernousova and Fursenko (1959: 455), but is preoccupied for the genus, s.l., by *Dictyoprora* Haeckel, 1881. The two subgenera thus become *Dictyoprora* (*Dictyoprora*) Haeckel, 1881, and *Dictyoprora* (*Sethamphora*) Haeckel, 1887.

Family Lophophaenidae Haeckel, 1881

Subfamily Lophophaeninae Haeckel, 1881

Dictyocryphalus Haeckel, 1887

Type species: Dictyocephalus obtusus Ehrenberg, 1861.

The generic name *Dictyocryphalus* Haeckel, 1887, was regarded by Campbell in Moore (1954: D128) as an objective synonym of *Dictyocephalus* Ehrenberg, 1861, and this genus was also referred to *Dictyocephalus* by Deflandre in Grassé (1953: 363), and to *Dictiocephalus* by Strelkov and Lipman in Rauser-Chernousova and Fursenko (1959: 456). *Dictyocephalus* Ehrenberg, 1861, Monatsber. Akad. Wiss. Berlin, 1860: 830, is a homonym of *Dictyocephalus* Leidy, 1857, Proc. Acad. Nat. Sci. Philadelphia, vol. 8: 256, Amph. The next available valid name is *Dictyocryphalus* Haeckel, 1887.

Family Theopiliidae Haeckel, 1881

Subfamily Theopiliinae Haeckel, 1881

Lipmanella Loeblich and Tappan, new name

Type species: Lithornithium dictyoceras Haeckel, 1860.

The new name is proposed for *Dictyoceras* Haeckel, 1862, Die Radiolarien, vol. 1: 333, not *Dictyoceras* Eichwald, 1860, Lethaea Ross., vol. 1: 1263, moll. It was recorded as *Dictyoceras* Haeckel by Campbell in Moore (1954: D130), and by Strelkov and Lipman in Rauser-Chernousova and Fursenko (1959: 402). The generic name is in honor of Professor R. K. Lipman, in recognition of his work on the radiolaria.

Subsuperfamily Stichoperilae Haeckel, 1881, name transferred

Family Stichoperidae Haeckel, 1881, name transferred

[Stichoperida Haeckel, 1881; Stichopilida Haeckel, 1881; Tetracyrtida Haeckel, 1881; Stichocyrtdia Haeckel, 1881; Podocampida Haeckel, 1887; Stichopiliidae Frizzell, 1951; Triacartilae Campbell, 1954; Triacartidae Campbell, 1954; Stichoperinae Campbell, 1954; Triacartinae Campbell, 1954]

Triacartus Haeckel, 1881, is regarded by Campbell in Moore (1954: D136) as including *Stichopilium* Haeckel, 1881, as an objective synonym, and the type is cited as *Stichopilium cortina* Haeckel, 1887. However,

Frizzell in Frizzell and Middour (1951: 31–32) regards the two as objective synonyms but designated *Stichopilium bicorne* as type species of both. The family group names based on *Stichopilium* needed replacement and Campbell therefore proposed as new names the subfamily Triacartinae, family Triacartidae, and subsuperfamily Triacartilae. Only the first needed replacement, however, as the family name Triacartidae Campbell, 1954, is preoccupied by the family group name Stichoperida Haeckel, 1881 (= Stichoperinae Campbell, 1954). The subsuperfamily Triacartilae Campbell, 1954, is preoccupied by the Stichoperida Haeckel, 1881, Artophormida Haeckel, 1881 (= Artophormididae and Artophormidinae Campbell, 1954 = correctly Artophormidae), Stichophormida Haeckel, 1881, Stichophatnida Haeckel, 1881 (= Stichophatninae Campbell, 1954), Stichocorida Haeckel, 1881 (= Stichocoridae Frizzell, 1951; Stichocorythidae Campbell, 1954), Lithocampida Haeckel, 1887, Stichocapsida Haeckel, 1881 (= Stichocapsinae Campbell, 1954), and Artocapsida Haeckel, 1881. It is here recognized as subsuperfamily Stichoperilae.

Family Artophormidae Haeckel, 1881

[Artophormida Haeckel, 1881; Artophaenida Haeckel, 1881; Artophormididae Campbell, 1954]

Anthocorys Haeckel, 1881

Subgenus *Cyrtocorys* Haeckel, 1887

Type species: Phormocampe mitra Haeckel, 1887.

Cyrtocorys Haeckel, 1887, was originally an invalidly changed spelling of *Cyrtocoris* Haeckel, 1881, Jena Zeitschr., vol. 15: 438, and thus a junior objective synonym. However, as *Cyrtocoris* Haeckel, 1881, is a homonym of *Cyrtocoris* White, 1842, Trans. Ent. Soc. London, vol. 3, no. 2: 89, Hem., the name *Cyrtocorys* may be used for this taxon. It was referred to *Anthocorys* (*Cyrtocorys*) Haeckel, 1882, by Campbell in Moore (1954: D139), but the spelling as *Cyrtocorys* dates only from 1887.

Family Aulosphaeridae Haeckel, 1862

Subfamily **Campbellellinae** Loeblich and Tappan, substitute name

[Aulonida Haeckel, 1887; Auloniinae Campbell, 1954]

As the type genus of the subfamily Auloniinae is a homonym, here renamed as *Campbellella,* the subfamily name must be replaced by that based on the valid generic name.

Campbellella Loeblich and Tappan, new name

Type species: Aulonia hexagonia Haeckel, 1887.

The new name is proposed for *Aulonia* Haeckel, 1887, Rep. Voy. *Challenger,* Zool., vol. 18, no. 40: 1633, a homonym of *Aulonia* Koch, 1847, Die Arachniden, vol. 14, pt. 3: 97. It was described as *Aulonia* by Campbell in Moore (1954: D150). The generic name is in honor of Professor A. S. Campbell, in recognition of his work on the Radiolaria.

Superfamily CHALLENGERIACEA Murray, 1876, name corrected

[Challengerida Murray, 1876; Challengeriicae Campbell, 1954]

Family **Lirellidae** Loeblich and Tappan, substitute name

As the family Cadiidae Borgert, 1910, is based on *Cadium* Bailey, 1856, a homonym of *Cadium* Link, 1807, the family name must be changed to one based on a valid genus.

Lirella Ehrenberg, 1872

Cadium Bailey, 1856, Amer. Jour. Sci., ser. 2, vol. 22, p. 3. *Type species: Cadium marinum* Bailey, 1856. Fixed by original designation (monotypy); not *Cadium* Link, 1807, Beschr. Nat. Samml. Univ. Rostock, vol. 3, p. 113, Moll.

Difflugia (*Lirella*) Ehrenberg, 1872, Abh. K. Akad. Wiss. Berlin for 1871, p. 248. *Type species:* (here designated) *Lirella baileyi* Ehrenberg, 1872, new name for *Cadium marinum* Bailey, 1856 = *Difflugia* (*Lirella*) *marina* (Bailey) Ehrenberg, 1872, not *Difflugia marina* Bailey, 1856.

?*Eucadium* Ehrenberg, 1872, Abh. K. Akad. Wiss. Berlin for 1871, p. 248. *Type species:* (here designated) *Difflugia* (*Lirella*) *seriata* Ehrenberg, 1872.

Beroetta Cleve, 1899, K. Svenska Vetens. Akad. Handl., vol. 22, no. 3, p. 27. *Type species: Beroetta melo* Cleve, 1899, fixed by original designation (monotypy).

Cadiumella Strand, 1928, Arch. Naturgesch., vol. 92, A8 for 1926, p. 31, new name for *Cadium* Bailey, 1856, not *Cadium* Link, 1807. *Type species: Cadium marinum* Bailey, 1856, objective.

Cadimella Stand, Campbell in Moore, 1954, Treatise on Invert. Paleontology, Pt. D, Protista 3, p. D152. Misspelling of *Cadiumella* and Strand, placed in synonomy of *Cadium* Bailey.

Cadium was described by Bailey in 1856, but was a homonym of *Cadium* Link, 1807, a mollusk, and therefore renamed by Strand in 1928. The homonymy and subsequent renaming has been overlooked by the recent Treatises (Deflandre in Grassé, 1953: 377, and Campbell in Moore, 1954: D152) and the genus recognized as *Cadium*. Campbell even included *Cadiumella* Strand (although generic name and author were both misspelled) and *Beroetta* Cleve, 1899, in the synonomy of *Cadium*.

Although *Cadiumella* was proposed as a substitute name for the homonym *Cadium*, it is preoccupied by *Beroetta* Cleve, which has long been regarded as congeneric (Borgert, 1910, Ergebnisse Plankton-Exped., Humboldt Stiftung, Kiel and Leipzig, vol. 10: 384–414). Furthermore, in 1872 Ehrenberg discussed *Cadium marinum* Bailey in connection with numerous other protozoans, many of which he regarded as belonging to *Difflugia* although now placed in many different genera, families and orders. He described a number of subgenera of *Difflugia*, one of which

Difflugia (*Lirella*) included three species in the original list. One of these was *Lirella baileyi,* new name for *Cadium marinum* Bailey, 1856, because Ehrenberg considered this a homonymous species, as he placed *Difflugia marina* Bailey (possibly = *Paraquadrula*) and *Cadium marinum* Bailey in the same "genus." This congeneric status has not since been accepted by any later workers, because *Difflugia marina* Bailey belongs to the Rhizopodea (Arcellacea) whereas *Cadium marinum* Bailey is a Radiolarian. Thus there is no true homonymy and species *Lirella baileyi,* here designated as type species of *Lirella* Ehrenberg, is an objective synonym of *Cadium marinum.* The genus therefore should be referred to *Lirella,* and the type species *Lirella baileyi* Ehrenberg = *Cadium marinum* Bailey. *Eucadium* was also proposed by Ehrenberg, with two species originally included, of which *Difflugia* (*Lirella*) *seriata* Ehrenberg is here designated as type.

Subclass Acantharia Haeckel, 1862

Superfamily Astrolonchacea Haeckel, 1881, name corrected

Family Astrolonchidae Haeckel, 1881

Subfamily Astrolonchinae Haeckel, 1881

Dipelicophora Loeblich and Tappan, new name

Type species: Dicranophora buetschlii Schewiakoff, 1926.

New name proposed for *Dicranophora* Schewiakoff, 1926, Fauna e Flora Golfo di Napoli, vol. 37: 163; not *Dicranophora* Macquart, 1834, Roret's Suite à Buffon, Diptères, vol. 1: 255 (Diptera). For discussion see Deflandre in Grassé (1953: 304) and Campbell in Moore (1954: D34).

Superfamily Dorataspacea Haeckel, 1862, name corrected

Family Dorataspidae Haeckel, 1862, name corrected

[Dorataspida Haeckel, 1862; Dorataspididae Campbell, 1954]

Orophaspis Haeckel, 1881

Orophaspis Haeckel, 1881, Jena. Zeitschr., vol. 15: 468.

Stegaspis Haeckel, 1881, Jena. Zeitschr. vol. 15: 468; objective; not *Stegaspis* Germar, 1833—Hem.

Type species: Orophaspis diporaspis Haeckel, 1887.

Campbell (1954: D37) recognizes *Stegaspis* Haeckel, with *Orophaspis* regarded as an objective synonym. *Orophaspis* is the valid name, as it has priority and, because *Stegaspis* Haeckel is a homonym.

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